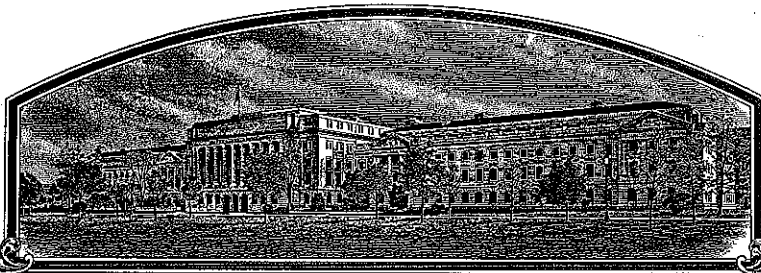


No.

200400247



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Seminis Vegetable Seeds, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

LETTUCE

'Heavy Heart'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this third day of November, in the year two thousand and six.

Attest:



Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER Seminis Vegetable Seeds, Inc.		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME PS 06516262	3. VARIETY NAME Heavy Heart
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) 2700 Camino del Sol Oxnard, CA 93030-7967		5. TELEPHONE (include area code) (805) 647-1572	FOR OFFICIAL USE ONLY PVPO NUMBER 200400247 FILING DATE June 28, 2004
		6. FAX (include area code) (805) 918-2545	
7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) Corporation	8. IF INCORPORATED, GIVE STATE OF INCORPORATION California	9. DATE OF INCORPORATION 4-Jun-1962	
10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. (First person listed will receive all papers) Sharen Chaffin & Carol Miller Seminis Vegetable Seeds, Inc. 37437 State Hwy 16 Woodland CA 95695 Marcel Bruins Seminis Vegetable Seeds, Inc. Nude 54D 6702 DN Wageningen The Netherlands marcel.bruins@seminis.com PH: 31 317 450218; FX 31 317 450217			FILING AND EXAMINATION FEES: \$ 3652.00 DATE 6/28/2004 CERTIFICATION FEE: \$ 768.00 DATE 11/1/2006
11. TELEPHONE (include area code) (530) 669-6172	12. FAX (include area code) (530) 666-4426	13. E-MAIL sharen.chaffin@seminis.com	14. CROP KIND (Common Name) Lettuce
15. GENUS AND SPECIES NAME OF CROP Lactuca Sativa L.		16. FAMILY NAME (Botanical) Asteraceae	17. IS THE VARIETY A FIRST GENERATION HYBRID? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse) a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of Variety d. <input type="checkbox"/> Exhibit D. Additional Description of the Variety (Optional) e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Owner's Ownership f. <input checked="" type="checkbox"/> Voucher Sample (2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository) g. <input checked="" type="checkbox"/> Filing and Examination Fee (\$3,652), made payable to "Treasurer of the United States" (Mail to the Plant Variety Protection Office)		19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? See Section 83(a) of the Plant Variety Protection Act <input type="checkbox"/> YES (If "yes", answer items 20 and 21 below) <input checked="" type="checkbox"/> NO (If "no", go to item 22) 20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? <input type="checkbox"/> YES <input type="checkbox"/> NO IF YES, WHICH CLASSES? <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED 21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input type="checkbox"/> YES <input type="checkbox"/> NO IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS. <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED (If additional explanation is necessary, please use the space indicated on the reverse.)	
22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (Please use space indicated on reverse.)		23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse.)	
24. The owners declare that a viable sample of basic seed of the variety has been furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate. The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Owner(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.			

SIGNATURE OF OWNER

SIGNATURE OF OWNER

NAME (Please print or type)

Sharen Chaffin

NAME (Please print or type)

CAPACITY OR TITLE

IP Specialist

DATE

6-24-04

CAPACITY OR TITLE

DATE

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be **received** in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to **reproduce** the variety, or for tuber reproduced varieties verification that a viable (*in the sense that it will reproduce an entire plant*) tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for \$3,652 (\$432 filing fee and \$3,220 examination fee), payable to "Treasurer of the United States" (See Section 97.6 of the Regulations and Rules of Practice.) Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfilled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. **Retain one copy for your files.** All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of \$432 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office

Telephone: (301) 504-5518

FAX: (301) 504-5291

Homepage: <http://www.ams.usda.gov/science/pvpo/pvp.htm>

ITEM

- 18a. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method; (2) the details of subsequent stages of selection and multiplication; (3) evidence of uniformity and stability; and (4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified
- 18b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:
- (1) identify these varieties and state all differences objectively;
 - (2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
 - (3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.
- 18c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.
- 18d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.
- 18e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.
19. If "Yes" is specified (*seed of this variety be sold by variety name only, as a class of certified seed*), the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. (See Regulations and Rules of Practice, Section 97.103).
22. See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.
23. See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.

21. CONTINUED FROM FRONT (Please provide a statement as to the limitation and sequence of generations that may be certified.)

22. CONTINUED FROM FRONT (Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)

23. CONTINUED FROM FRONT (Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. There is no charge for filing a change of address. The fee for filing a change of ownership or assignment or any modification of owner's name is specified in Section 97.175 of the regulations. (See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, Room 213, Building 306, Beltsville Agricultural Research Center-East, Beltsville, MD 20705. Telephone: (301) 504-8089. <http://www.ams.usda.gov/lsg/seed.htm>

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 3.0 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, sexual orientation, marital or family status, political beliefs, parental status, or protected genetic information. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

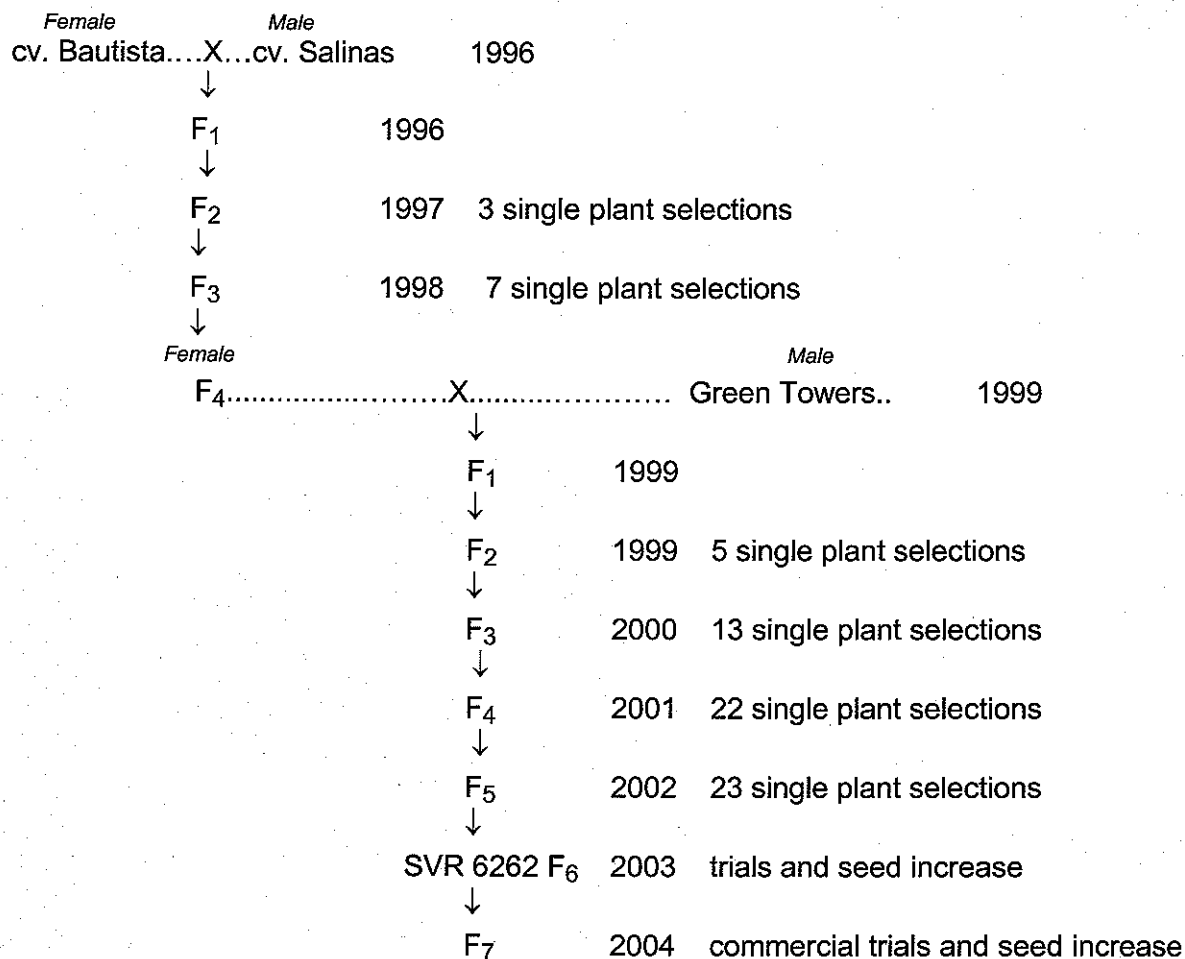
To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

ST-470 (02-10-2003) designed by the Plant Variety Protection Office with Word 2000. Replaces former versions of ST-470, which are obsolete.

Exhibit A. Origin and Breeding History of Lettuce cv. Heavy Heart (SVR 6262)

Pedigree of cv. Heavy Heart

200400247



Cv. Heavy Heart (SVR 6262) originated in 1996 with the cross cv. Bautista by cv. Salinas. An F₄ selection from this cross was crossed to cv. Green Towers in 1999. Single plant selections were made in subsequent years in the areas of intended commercialization. By F₅ a group of 23 families was judged uniform and bulked for trialing and seed increase. An F₆ mass was trialed extensively during 2003 and an increase of F₇ seed is being trialed throughout the production areas of California and Western Arizona this year and also produced in the San Joaquin Valley of California.

The breeding work was carried out by Dr. William Waycott at the Seminis Vegetable Seed's Research Station at Arroyo Grande, California. Replicated field trials were conducted in production areas during 2003.

The breeding method employed was pedigree selection, using both single plant selection and mass selection practices. The selection criteria for cv. Heavy Heart were:

1. a romaine cultivar with increased uniformity and improved heading ability, adapted to growing conditions in Coastal California, when compared to the most similar variety, cv. Green Forest.
2. resistance to California pathotypes I, IIA, IIB, III, IV, and V of downy mildew.
3. resistance to corky root rot.
4. an increased ability to produce romaine hearts.

In trials of cv. Heavy Heart during 2003, we have seen neither genetic variants nor off-types in more than 3,500 plants.

In trials of cv. Heavy Heart during the last three years covering generations F₇ to F₉, we have seen neither genetic variants nor off-types in more than 5,500 plants, indicating that this variety is genetically uniform and stable.

Cv. Heavy Heart is described as a vigorous romaine lettuce cultivar adapted to Coastal California lettuce growing areas. Cv. Heavy Heart is sown during October and November in Southern California and Western Arizona, in December and January in the San Joaquin Valley of California, and from January to August in the production areas of Coastal California. Cv. Heavy Heart is resistant to California pathotypes I, IIa, IIb, III, IV, and V of downy mildew and to corky root rot, strain CA1. Cv. Heavy Heart was selected for improved uniformity and performance compared to the most similar commercial cultivar, cv. Green Forest, and to produce romaine hearts, a valued added product suited for tight-heading romaine varieties.

Phenotypically, cv. Heavy Heart is distinct from cv. Green Forest. In replicated field trials, heads of cv. Heavy Heart were taller (34.9 cm vs. 29.6 cm), narrower (21.4 cm vs. 25.9 cm), and heavier (1188 g vs. 1011 g), when compared to cv. Green Forest (Table 1). Leaf color for cv. Heavy Heart (RHC color chart 146B) was lighter than that of cv. Green Forest (146A), while ability to form romaine hearts was stronger for the cv. Heavy Heart. Cv. Heavy Heart was more susceptible to premature stem elongation (bolting) (61 days to 15 cm vs. 67 days) compared to cv. Green Forest and to tipburn (1.4 lesions per head vs. 0.5 lesions).

The data presented here are statistically different at the 95% confidence level, exhibiting a range of means for tipburn presence from 1.33 to 1.37 for cv. Heavy Heart and from 0.30 to 0.35 for cv. Green Forest, of means for plant diameter from 33.56 to 33.75 for cv. Heavy Heart and from 29.42 to 29.63 for cv. Green Forest, of means for head diameter from 21.32 to 21.88 for cv. Heavy Heart and from 25.83 to 25.97 for cv. Green Forest, and of means for head weight from 1184.84 to 1189.66 for cv. Heavy Heart and from 1008.08 to 1012.93 for cv. Green Forest, using the 0.95 probability of generating confidence intervals (CI) that contains the means.

'Heavy Heart' does contain the *DM18* gene and 'Green Forest' does not.

Revised: 18-Aug-06

Table 1. Evaluation of Heavy Heart (SVR 6262) and the most similar cultivar, Green Forest, for several important characters.

Trial No	Cultivar	Rep No.	Color ^a	Downy Mildew Resist. ^b	Corky Root Rot Resist. ^c	Tipburn Presence ^d	Plant Height ^e	Head Diam. ^f	Head Weight ^g	No. of Days to 15 cm ^h
Trial 1: Evaluated 10 June 2003 Salinas Valley, CA	Heavy Heart:	Rep. 1	146B	I,IIa,IIb, III,IV,V	Resist.	1.4±0.1	35.4±0.4	21.2±0.3	1212±11.0	60
		Rep. 2	146B	I,IIa,IIb, III,IV,V	Resist.	1.2±0.1	34.8±0.4	21.8±0.2	1179±10.5	61
		Average: 146B I,IIa,IIb, III,IV,V Resist. 1.3±0.1 35.1±0.4 21.5±0.3 1196±10.8 61								
		Rep. 1	146A	Suscept.	Suscept.	0.5±0.1	30.3±0.4	25.8±0.3	1073±10.9	66
		Rep. 2	146A	Suscept.	Suscept.	0.3±0.1	29.7±0.5	25.4±0.3	981±10.8	67
Trial 2: Evaluated: 17 July 2003 Salinas Valley, CA	Heavy Heart:	Average: 146A Suscept. Suscept. 0.4±0.1 30.0±0.5 25.6±0.3 1027±10.9 67								
		Rep. 1	146B	I,IIa,IIb, III,IV,V	Resist.	1.3±0.1	34.4±0.4	21.5±0.2	1170±10.6	61
		Rep. 2	146B	I,IIa,IIb, III,IV,V	Resist.	1.5±0.1	34.7±0.5	21.0±0.2	1188±10.5	61
		Average: 146B I,IIa,IIb, III,IV,V Resist. 1.4±0.1 34.6±0.5 21.3±0.2 1179±10.6 61								
		Rep. 1	146A	Suscept.	Suscept.	0.5±0.1	28.7±0.5	26.3±0.3	1002±10.8	68
Green Forest:	Green Forest:	Rep. 2	146A	Suscept.	Suscept.	0.6±0.1	29.4±0.4	26.1±0.3	986±10.8	66
		Average: 146A Suscept. Suscept. 0.6±0.1 29.1±0.4 26.2±0.3 994±10.8 67								

Range of variation among means of statistically significant differences at the 95% level using the confidence interval [CI = mean ± (SDXSE)]:
 cv. Heavy Heart 1.33 to 1.37 33.56 to 33.75 21.32 to 21.88 1184.84 to 1189.66
 cv. Green Forest 0.30 to 0.35 29.42 to 29.63 25.83 to 25.97 1008.08 to 1012.93

^a Color evaluation was done using the Royal Horticultural Society color chart, U.K.
^b Downy mildew survey reported as resistance to California Pathotypes I through V, using two replications each having 15 seedlings, grown in laboratory screens.
^c Corky root rot survey of using five replications, each having 25 roots from plants grown in field trials in Monterey Counties, CA, evaluated between June and August, 2003.
^d Mean tipburn incidence (number of lesions per head) using two sowing dates of 20 plants per replication ± standard deviation.
^e Mean plant height using two sowing dates of 20 plants per replication in cm ± standard deviation.
^f Mean head diameter using two sowing dates of 20 plants per replication in cm ± standard deviation.
^g Mean head weight using two sowing dates of 20 plants per replication in grams ± standard deviation.
^h Mean number of days until stem reaches 15 cm using two replications of 20 plants each.

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U. S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705

EXHIBIT C
(Lettuce)

OBJECTIVE DESCRIPTION OF VARIETY
LETTUCE (*Lactuca sativa* L.)

NAME ADDRESSEE Seminis Vegetable Seeds, Inc. 2700 Camino del Sol Oxnard, CA 93030-7967		FOR OFFICIAL USE ONLY
		VPPO NUMBER 200400247
		VARIETY NAME HEAVY HEART
		EXPERIMENTAL DESIGNATION SUR6262

Place the appropriate number that describes the varietal character in the boxes below. Place a zero in the first box (eg. 099 or 09) when number is either 99 or less or 9 or less. Measured data should be the mean of an appropriate number (at least 20) of well spaced plants. Royal Horticultural Society or any recognized color standard may be used to determine plant colors.

The location of the test area is: CALIFORNIA, ARIZONA Color System Used: ROYAL HORT. SOC.

SPECIFIC VARIETIES USED FOR COMPARISON AS CHECK VARIETIES IN THIS APPLICATION: Use standard regional check varieties which are adapted to your area. One of the comparison varieties must be the most similar variety used in Exhibit B.

Application Variety (a1.) HEAVY HEART Most Similar Variety (c1.) GREEN FOREST
Standard Regional Check Variety (c2.) PARRIS ISLAND COS

1. PLANT TYPE: (See list of suggested check varieties page 4.)

01= Cutting/Leaf	04= Cos or Romaine	07= Salinas Group	10= Latin
02= Butterhead	05= Great Lakes Group	08= Eastern (Ithaca) Group	11= OTHER (Specify below):
03= Bibb	06= Vanguard Group	09= Stem	

(a1.) 04 (c1.) 04 (c2.) 04

2. SEED:

(a1.) <input type="text"/> 2	COLOR	(a1.) <input type="text"/> 1	LIGHT DORMANCY	(a1.) <input type="text"/> 1	HEAT DORMANCY
(c1.) <input type="text"/> 2	1= White (Silver Grey)	(c1.) <input type="text"/> 1	1= Light Required	(c1.) <input type="text"/> 1	1= Susceptible
(c2.) <input type="text"/> 1	2= Black (Grey Brown)	(c2.) <input type="text"/> 1	2= Light Not Required	(c2.) <input type="text"/> 1	2= Not Susceptible
	3= Brown (Amber)				

3. COTYLEDON TO FOURTH LEAF STAGE: NOTE: Provide a color photograph or photocopy of the fourth leaf from 20 day old seedling grown under optimal conditions.

SHAPE OF COTYLEDONS: 1=Broad 2= Intermediate 3= Spatulate

(a1.) 3 (c1.) 3 (c2.) 3

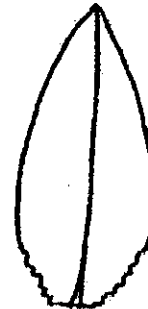
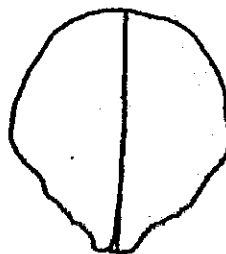
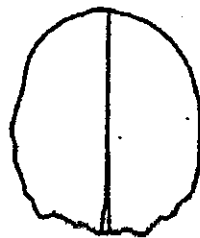
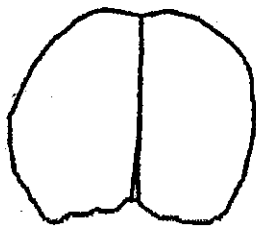
3. Cotyledon to Fourth Leaf Stage (Continued)

SHAPE OF FOURTH LEAF:

(a1.) 4

(c1.) 4

(c2.) 4



1.

2.

3.

4.

5.

6.

LENGTH/WIDTH INDEX OF FOURTH LEAF: L/W x 10

(a1.) 19

(c1.) 18

(c2.) 19

APICAL MARGIN:

1= Entire

2= Crenate/Gnawed

3= Finely Dentate

4= Moderately Dentate

5= Coarsely Dentate

6= Incised

7= Lobed

8= OTHER (Specify below):

(a1.) 1

(c1.) 1

(c2.) 1

BASAL MARGIN:

(Use the options for Apical Margin above)

(a1.) 4

(c1.) 4

(c2.) 4

UNDULATION:

1= Flat

2= Slight

3= Medium

4= Marked

(a1.) 1

(c1.) 1

(c2.) 1

GREEN COLOR:

1= Yellow Green

2= Light green

3= Medium Green

4= Dark Green

5= Blue Green

6= Silver Green

7= Grey Green

(a1.) 3

(c1.) 4

(c2.) 3

ANTHOCYANIN:

DISTRIBUTION:

1= Absent

2= Margin Only

3= Spotted

4= Throughout

5= OTHER (Specify below):

(a1.) 1

(c1.) 1

(c2.) 1

CONCENTRATION:

1= Light

2= Moderate

3= Intense

(a1.) 1

(c1.) 1

(c2.) 1

3. Cotyledon to Fourth Leaf Stage (Continued)

ROLLING:

1= Absent

2= Present

(a1.)

☐

(c1.)

☐

(c2.)

☐

CUPPING:

1= Uncupped

2= Slight

3= Markedly

(a1.)

☐

(c1.)

☐

(c2.)

☐

REFLEXING:

1= None

2= Apical Margin

3= Lateral Margins

(a1.)

☐

(c1.)

☐

(c2.)

☐

4. MATURE LEAVES (Observe Harvest-Mature Outer Leaves)

NOTE: Provide color photo of a harvest-mature leaf which accurately shows color and margin characteristics.

MARGIN:

INCISION DEPTH:

(deepest penetration of the margin)

1= Absent/Shallow (Dark Green Boston)

3= Deep (Great Lakes 659)

2= Moderate (Vanguard)

(a1.)

☐

(c1.)

☐

(c2.)

☐

INDENTATION:

(finest divisions of the margin)

1= Entire (Dark Green Boston)

2= Shallowly Dentate (Great Lakes 65)

3= Deeply Dentate (Great Lakes 659)

4= Crenate (Vanguard)

5= OTHER (Specify): _____

(a1.)

☐

(c1.)

☐

(c2.)

☐

UNDULATIONS OF THE

APICAL MARGIN:

1= Absent/ Slight (Dark Green Boston)

3= Strong (Great Lakes 659)

2= Moderate (Vanguard)

(a1.)

☐

(c1.)

☐

(c2.)

☐

GREEN COLOR:

1= Very Light Green (Bibb)

2= Light green (Minetto)

3= Medium Green (Great Lakes)

4= Dark Green (Vanguard)

5= Very Dark Green

6= OTHER (Specify): _____

(a1.)

☐

(c1.)

☐

(c2.)

☐

ANTHOCYANIN:

DISTRIBUTION:

1= Absent

2= Margin Only (Big Boston)

3= Spotted (Calif. Cream Butter)

4= Throughout (Prize Head)

5= OTHER (Specify below): _____

(a1.)

☐

(c1.)

☐

(c2.)

☐

CONCENTRATION:

1= Light (Iceberg)

2= Moderate (Prize Head)

3= Intense (Ruby)

(a1.)

☐

(c1.)

☐

(c2.)

☐

4. Mature Leaves (Continued)

SIZE:	1= Small	2= Medium	3= Large
	(a1.) <input type="text" value="3"/>	(c1.) <input type="text" value="3"/>	(c2.) <input type="text" value="3"/>
GLOSSINESS:	1= Dull (Vanguard)	2= Moderate (Salinas)	3= Glossy (Great Lakes)
	(a1.) <input type="text" value="2"/>	(c1.) <input type="text" value="2"/>	(c2.) <input type="text" value="2"/>
BLISTERING:	1= Absent/Slight (Salinas)	2= Moderate (Vanguard)	3= Strong (Prize Head)
	(a1.) <input type="text" value="1"/>	(c1.) <input type="text" value="2"/>	(c2.) <input type="text" value="2"/>
LEAF THICKNESS:	1= Thin	2= Intermediate	3= Thick
	(a1.) <input type="text" value="2"/>	(c1.) <input type="text" value="2"/>	(c2.) <input type="text" value="2"/>
TRICHOMES:	1= Absent (Smooth)	2= Present (Spiny)	
	(a1.) <input type="text" value="1"/>	(c1.) <input type="text" value="1"/>	(c2.) <input type="text" value="1"/>

5. PLANT

SPREAD OF FRAME LEAVES: (a1.) cm (c1.) cm (c2.) cm

HEAD DIAMETER: (market trimmed with single cap leaf)

(a1.) cm (c1.) cm (c2.) cm

HEAD SHAPE: 1= Flattened 3= Spherical 5= Non-Heading
2= Slightly Flattened 4= Elongate 6= OTHER (Specify): _____

(a1.) (c1.) (c2.)

HEAD SIZE CLASS: 1= Small 2= Medium 3= Large

(a1.) (c1.) (c2.)

HEAD PER CARTON:

(a1.) (c1.) (c2.)

HEAD WEIGHT:

(a1.) g (c1.) g (c2.) g

HEAD FIRMNESS: 1= Loose 2= Moderate 3= Firm 4= Very Firm

(a1.) (c1.) (c2.)

6. BUTT

SHAPE:

1= Slightly Concave

2= Flat

3= Rounded

(a1.) 3

(c1.) 3

(c2.) 3

MIDRIB:

1= Flattened (Salinas)

2= Moderately Raised

3= Prominently Raised (Great Lakes 659)

(a1.) 2

(c1.) 2

(c2.) 2

7. CORE

DIAMETER AT BASE OF HEAD:

(a1.) 36 mm

(c1.) 35 mm

(c2.) 37 mm

RATIO OF HEAD DIAMETER/CORE DIAMETER:

(a1.) 12.8

(c1.) 12.3

(c2.) 11.4

CORE HEIGHT FROM BASE OF HEAD TO APEX:

(a1.) 88 mm

(c1.) 56 mm

(c2.) 63 mm

8. BOLTING (Give First Water Date: 28 APRIL 03) NOTE: First Water Date is the date seed first receives adequate moisture to germinate. This can and often does equal the planting date.

NUMBER OF DAYS FROM FIRST WATER DATE TO SEED STALK EMERGENCE (summer conditions):

(a1.) 52

(c1.) 63

(c2.) 65

BOLTING CLASS:

1= Very Slow

3= Medium

5= Very Rapid

2= Slow

4= Rapid

(a1.) 4

(c1.) 3

(c2.) 3

HEIGHT OF MATURE SEED STALK:

(a1.) 146 cm

(c1.) 128 cm

(c2.) 137 cm

SPREAD OF BOLTER PLANT: (at widest point)

(a1.) 38 cm

(c1.) 37 cm

(c2.) 40 cm

BOLTER LEAVES:

1= Straight

2= Curved

(a1.) 1

(c1.) 1

(c2.) 1

MARGIN:

1= Entire

2= Dentate

(a1.) 1

(c1.) 1

(c2.) 1

8. Bolting (Continued)

COLOR:

1= Light Green 2= Medium Green 3= Dark Green
(a1.) (c1.) (c2.)

BOLTER HABIT:

TERMINAL INFLORESCENCE:

1= Absent 2= Present
(a1.) (c1.) (c2.)

LATERAL SHOOTS:

1= Absent 2= Present
(a1.) (c1.) (c2.)

BASAL SIDE SHOOTS:

1= Absent 2= Present
(a1.) (c1.) (c2.)

9. MATURITY

(earliness of harvest-mature head formation)

NOTE: Complete this section for at least one season.

SEASON	APPLICATION VARIETY no. of days			MOST SIMILAR VARIETY no. of days			STANDARD REGIONAL CHECK VARIETY no. of days		
Spring		6	0						
Summer		5	3						
Fall		5	7						
Winter									

Give planting date(s) and location(s):

Spring: 10 APR 03 SALINAS, CA
Summer: 26 JUN 03 SALINAS, CA
Fall: 21 AUG 03 SANTA MARIA, CA
Winter:

1. First Water Date to Harvest

10. ADAPTATION:

PRIMARY REGIONS OF ADAPTATION (tested and proven adapted):

(0= Not Tested

1= Not Adapted

2= Adapted)

Southwest (CA and/or AZ desert) West Coast Northeast
 North-central Southeast OTHER (Specify):

SEASON:

Spring (Area CALIFORNIA, ARIZONA) Fall (Area CALIFORNIA, ARIZONA)
 Summer (Area CALIFORNIA, ARIZONA) Winter (Area CALIFORNIA, ARIZONA)

GREENHOUSE: 0= Not Tested 1= Not Adapted 2= Adapted

SOIL TYPE: 1= Mineral 2= Organic 3= Both

11. VIRAL DISEASES

1= Immune 3= Resistant 5= Moderately Resistant/Moderately Susceptible 7= Susceptible 9= Highly Susceptible

Big Vein	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Lettuce Mosaic	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Cucumber Mosaic	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Tomato Bushy Stunt, cause of dieback	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Turnip Mosaic	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Beet Western Yellows	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Lettuce Infectious Yellows	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
OTHER (Specify): _____	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>

12. FUNGAL/BACTERIAL DISEASES

1= Immune 3= Resistant 5= Moderately Resistant/Moderately Susceptible 7= Susceptible 9= Highly Susceptible

Corky Root Rot	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
(Races: <u>CA 1</u>)						
Downy Mildew	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
(Races: <u>CAI, IIa, IIb, III, IV, V</u>)						
Powdery Mildew	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Sclerotinia Drop	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Bacterial Soft Rot (<i>Pseudomonas</i> spp. and others)	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Botrytis (Grey Mold)	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Verticillium Wilt	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Bacterial Leaf Spot	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Anthracnose	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
OTHER (Specify): _____	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>

13. INSECTS

1= Immune 3= Resistant 5= Moderately Resistant/Moderately Susceptible 7= Susceptible 9= Highly Susceptible

Cabbage Loopers	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Root Aphids	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Green Peach Aphid	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Lettuce Aphid	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Pea Leafminer	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
OTHER (Specify): _____	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>

14. PHYSIOLOGICAL STRESSES

1= Immune 3= Resistant 5= Moderately Resistant/Moderately Susceptible 7= Susceptible 9= Highly Susceptible

Tipburn	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Heat	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Drought	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Cold	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Salt	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
Brown Rib (Rib Discoloration, Rib Blight)	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>
OTHER (Specify): _____	(a1.)	<input type="checkbox"/>	(c1.)	<input type="checkbox"/>	(c2.)	<input type="checkbox"/>

15. POSTHARVEST STRESS

1= Immune 3= Resistant

5= Moderately Resistant/Moderately Susceptible 7= Susceptible

9= Highly Susceptible

Pink Rib	(a1.) <input type="checkbox"/>	(c1.) <input type="checkbox"/>	(c2.) <input type="checkbox"/>
Russet Spotting	(a1.) <input type="checkbox"/>	(c1.) <input type="checkbox"/>	(c2.) <input type="checkbox"/>
Rusty Brown Discoloration	(a1.) <input type="checkbox"/>	(c1.) <input type="checkbox"/>	(c2.) <input type="checkbox"/>
Internal Rib Necrosis (Blackheart, Grey Rib, Grey Streak)	(a1.) <input type="checkbox"/>	(c1.) <input type="checkbox"/>	(c2.) <input type="checkbox"/>
Brown Stain	(a1.) <input type="checkbox"/>	(c1.) <input type="checkbox"/>	(c2.) <input type="checkbox"/>

16. BIOCHEMICAL OR ELECTROPHORETIC MARKERS

17. COMMENTS

Suggested Check Varieties

	<u>TYPE</u>	<u>CHECK VARIETY</u>
1	Cutting/Leaf	Waldmann's Green
2	Butterhead	Dark Green Boston
3	Bibb	Bibb
4	Cos or Romaine	Parris Island
5	Great Lakes Group	Great Lakes 659-700
6	Vanguard Group	Vanguard
7	Salinas Group	Salinas
8	Eastern Group	Ithaca
9	Stem	Celtuce
10	Latin	Little Gem

REFERENCES

- Bowring, J.D.C., 1969. "The Identification of Varieties of Lettuce (*Lactuca sativa* L.)". *Journal of the National Institute of Agricultural Botany* 11:499-520. National Institute of Agricultural Botany, Cambridge, UK
- Davis, R.M., K.V. Subbarao, R.N. Raid, and E.A. Kurtz., 1997. "Compendium of Lettuce Diseases". APS Press, St. Paul, MN
- Michelmore, R. W., J. M. Norwood, D. S. Ingram, I. R. Crute and P. Nicholson. 1984. The inheritance of virulence in *Bremia lactucae* to match resistance factors 3, 4, 5, 6, 8, 9, 10 and 11 in lettuce (*Lactuca sativa*). *Plant Pathology* 32:176-177.
- Norwood, J. M., R. W. Michelmore, I. R. Crute and D. S. Ingram. 1983. "The inheritance of specific virulence of *Bremia lactucae* (Downy mildew) to match R-factors 1, 2, 4, 6 and 11 in lettuce (*Lactuca sativa*)". *Plant Pathology* 32:176-177.
- Rodenburg, C.M., et al., 1960. "Varieties of Lettuce. An International Monograph," Instituut voor de Verdeling van Tuinbouwgewassen (IVT), Wageningen, NL
- Ryder, E.J., 1999. "Lettuce, Endive and Chicory". CABI Publications, Wallingford, UK



Fourth leaf from 20-day old seedlings, Heavy Heart (SVR 6262)



Harvest -mature leaf, Heavy Heart (SVR 6262)

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). The information is held confidential until the certificate is issued (7 U.S.C. 2426).

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

1. NAME OF APPLICANT(S) Seminis Vegetable Seeds, Inc.	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER PS 06516262	3. VARIETY NAME Heavy Heart
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country) 2700 Camino del Sol Oxnard, CA 93030-7967	5. TELEPHONE (Include area code) (805) 647-1572	6. FAX (Include area code) (805) 918-2545
7. PVPO NUMBER 200400247		

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. If no, please explain.

☒

YES

☐

NO

9. Is the applicant (individual or company) a U.S. national or a U.S. based company? If no, give name of country.

☒

YES

☐

NO

10. Is the applicant the original owner?

☒

YES

☐

NO

If no, please answer one of the following:

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?

☐

YES

☐

NO

If no, give name of country

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?

☐

YES

☐

NO

If no, give name of country

11. Additional explanation on ownership (Trace ownership from original breeder to current owner. Use the reverse for extra space if needed):

The variety named in this application was developed by the Seminis Vegetable Seeds, Inc., employee (breeder) named below. Unless otherwise stated, all rights to the varieties developed by Seminis Vegetable Seeds, Inc. are assigned to the Company by agreement or by operation of law. No rights to such invention, discovery or development are retained by the employee(s).

Employee (Breeder): Bill Waycott

Site Location: Arroyo Grande, CA

PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.

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